

CLAIMS PTO

WHAT IS CLAIMED IS:

1. A vibrator support structure comprising:
a vibrator;
a substrate; and
support pins, wherein the vibrator is supported on the substrate through the support pins, wherein substrate connection portions of the support pins and pin connection portions of the substrate are joined through conductive adhesive which is made of resin including a conductive filler and has a pencil hardness of about 4H or less, and the conductive adhesive has a thickness that is sufficient to buffer vibrations and impacts propagated through the support pins.
2. A vibrator support structure as claimed in claim 1, wherein an opening allowing portions of the conductive adhesive existing between the vibrator connection portion of the support pins and the vibrator to ooze out is provided in the vibrator connection portion of the support pins.
3. A vibrator support structure as claimed in claim 1, wherein an opening allowing portions of the conductive adhesive existing between the substrate connection portion of the support pins and the pin connection portion of the substrate to ooze out is provided in the substrate connection portion of the support pins.
4. A vibrator support structure as claimed in claim 1, wherein the vibrator has a substantially rectangular solid configuration.

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5. A vibrator support structure as claimed in claim 1, wherein at least four of the support pins are provided.

6. A vibrator support structure as claimed in claim 1, wherein the support pins are made of a thin metal plate.

Rule 1.126
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~~8.~~ A vibrator support structure as claimed in claim 1, wherein the substrate is a piezoelectric substrate.

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~~9.~~ A vibrator support structure as claimed in claim 1, wherein the vibrator includes a pair of piezoelectric substrates.

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~~10.~~ A vibrator support structure as claimed in claim ~~9~~, wherein the pair of piezoelectric substrates are polarized in opposite directions.

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~~11.~~ A vibrator support structure as claimed in claim 1, wherein the vibrator connection portions of the support pins are joined to locations corresponding to vibration nodal points of the vibrator.

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~~12.~~ A vibrator support structure as claimed in claim 2, wherein the opening has one of a round shape, a square shape and a cut groove configuration.

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~~13.~~ A vibrator support structure as claimed in claim 3, wherein the opening has one of a round shape, a square shape and a cut groove configuration.

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~~14~~. A vibrator support structure as claimed in claim 1, wherein a first opening allowing portions of the conductive adhesive existing between the vibrator connection portion of the support pins and the vibrator to ooze out is provided in the vibrator connection portion of the support pins, and a second opening allowing portions of the conductive adhesive existing between the substrate connection portion of the support pins and the pin connection portion of the substrate to ooze out is provided in the substrate connection portion of the support pins, the first and second openings having substantially the same configuration.

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~~15~~. A method of manufacturing a vibrator support structure comprising the steps of:
providing a vibrator which is supported on a substrate through support pins; and
hardening conductive adhesive for joining a substrate connection portion of the support pins and a pin connection portion of the substrate, the conductive adhesive existing therebetween, while only the weight of the vibrator and the support pins is applied.

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~~14~~ ¹⁶. A method of manufacturing a vibrator support structure as claimed in claim ~~15~~, further comprising the step of coating each of the substrate connection portion and the pin connection portion with conductive adhesive in advance for joining the substrate connection portion of the support pins and the pin connection portion of the substrate.

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~~14~~ ¹⁷. A method of manufacturing a vibrator support structure as claimed in claim ~~15~~, wherein the conductive adhesive is made of resin including a conductive filler and has a pencil hardness of about 4H or less.

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~~18.~~ A method of manufacturing a vibrator support structure as claimed in claim
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~~15~~, wherein the conductive adhesive has a thickness that is sufficient to buffer
vibrations and impacts propagated through the support pins.